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A Positive-Definite Moist EDMF Parameterization Scheme for Turbulent Mixing in the PBL

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Planetary boundary layer (PBL) parameterizations using the eddy diffusivity - mass flux (EDMF) technique for turbulent mixing in the convective PBL have been popularly used in weather and climate models. When including moist adjustment processes, some numerical implementations of the EDMF parameterization may result in unphysical solutions of cloud condensate, for example, negative cloud water quantities. To solve this problem, a procedure to obtain a positive definite solution is proposed to solve the moist EDMF equations. In this presentation, we will demonstrate the formulation of the solution procedure and show examples of its impact on the PBL mixing simulation using a single-column model.